

Glossary of nonwoven terms

A B C D E F G H I J K L
M N O P Q R S T U V W

A a

Absorption. The process by which a material takes in a gas or liquid.

Adsorption. The adhesion on the surface layer of a material by a gas or liquid.

Airforming, airlaying. The technique of dispersing fibers in a moving airstream and then collecting on a forming surface to produce lofty, porous webs.

Arachne machine. A Czechoslovakian machine that uses knitting elements for stitchbonding nonwovens.

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B b

Backing. A reinforcing material for the back layer of products such as carpet or wallpaper.

Backsheet. The backing material on an absorbent product such as a diaper or adult incontinence product, usually constructed of polyethylene or polyethylene with a nonwoven laminated to it.

Bacteriostat. Chemical additive that inhibits the growth of bacteria.

Bale. The package (approximately 500 lb.) in which fiber is shipped.

Basis weight. Weight of a unit area of fabric, sheet, or web.

Batt. Lofty and loosely held fiber network (also see Web).

Beater. Machine that separates and cleans fibers prior to web formation.

Bicomponent fiber. Fiber combining segments of two differing compositions, generally side-by-side or one inside another (core and sheath).

Binder. A material added during or after web formation that causes fibers to adhere to one another in webs; also used to describe material to adhere pigments, etc., to a surface.

Binder fiber. A fiber with a lower melting point than other matrix fiber or web elements that is activated through the application of heat (also see Thermal Bonding).

Blend. Two or more fiber types combined.

Bonding. The process of joining fibers in a web to provide strength.

Brushing. A mechanical finishing process of lifting fibers to the fabric surface and orienting the raised fiber in the machine direction of the fabric.

Bulking. The process of adding volume to fabrics; can entail increasing crimp of constituent fibers.

Burst strength. The force required to rupture a fabric.

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C c

Calender. A machine consisting of two or more cylinders or rolls that can apply controlled and uniform pressure to a fabric or web as it goes through the nip.

Calendering. A finishing process that subjects fabric to pressure and sometimes heat in order to bond, emboss, or compact.

Card. A machine that combs or works fibers between the fine surfaces or points of a toothed surface in order to separate, clean, and align the fibers in a parallel orientation.

Carding. The process that transforms entangled fiber mats into parallel fibrous webs.

Carrier web. A transporting member for moving a material through a processing stage.

Cellulose. A polymeric substance that constitutes the chief part of the cell wall of plants and is naturally in fibrous products such as cotton, flax, rayon, and jute.

Chemical finishing. The process of adding chemicals to a web or fabric in

order to enhance properties such as flame resistance, wetting, repellency, color, etc.

Cleanroom. A room for the manufacture of products (precision instruments, drugs, integrated circuits, etc.) in a scrupulously clean environment.

Clothing (card). The combing or working points on a card cylinder.

Coating. A finishing material applied to the surface of fabric, generally in a very uniform manner.

Combing. A part of the carding process when nap is removed and fibers are aligned.

Composite. A layered structure that combines a nonwoven material with other layered materials, wherein there is an integrated interface.

Converting. Final steps in manufacturing nonwoven products from roll goods. The process of changing a nonwoven fabric in a final, finished product, generally involves changing fabric's physical configuration and combining the fabric with other materials.

Cotton fiber. A soft, downy, cellulosic fiber attached to the seeds of the cotton plant of the genus *Gossypium*; mostly grown in warm climates.

Cotton linters. Short cotton fibers that are not removed from the seed during the first ginning.

Coverstock. Lightweight material used to cover absorbent cores in medial or hygienic products.

Creep. The deformation exhibited by a material when held at constant stress or applied force.

Creping. The finishing process of compressive shrinkage that imparts crimp, bulk, and a puckered surface.

Crimp. Waviness or undulation in a fiber; generally experienced as the number of undulations per inch.

Cross-direction. Perpendicular to the direction in which a fabric moves through a machine.

Crosslapper. A machine that continuously lays a web so that its fibers are oriented in a cross direction.

Cross lapping or cross laying. The process of laying a web on a conveyor, moving at right angles so the web's fibers are oriented in a cross direction.

Cross-linking. The process by which polymers form bonds between molecular chains, to form a three-dimensional polymeric network.

Curing. Heating of resin or binder in or on fabrics to cause or complete a chemical reaction.

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D d

Denier. Unit of filament or fiber measurement of linear density based on the weight of a fiber per its unit length; unit varies within regions. In the U.S., denier is measured in grams of 9,000 m of material (the lower the number, the finer the fiber); this generally is expressed as denier per filament (dpf). Some countries outside the U.S. use the Tex system which equates the weight in grams of one kilometer of fiber.

Dryforming, drylaying. The process of making nonwoven webs from dry fibers via the carding or airlaying process.

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E e

Elastomers. Elastic polymers.

Embossing. The process of imparting a pattern in relief or three dimensions to a fabric surface.

Emulsion. A system of finely divided liquid droplets dispersed in a second immiscible liquid.

Entanglement. Web bonding method that wraps or knots individual fibers into an integrated structure; can be done mechanically (needling) or hydraulically (water jets; see also Hydroentangling).

Extrusion. The method by which molten polymer is forced through an orifice to form a fiber, film, sheet, shape, etc.

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F f

Felt. A fabric of fibers entangled by mechanical reorientation of some of the fibers within the structure; produced using barbed needles; also referred to as needlefelt.

Fiber. Unit of matter, synthetic or natural, characterized by a high ratio of length-to-width.

Fiberfill. Low-density fibrous structures used in apparel, bedding, and other products.

Fiberglass. Glass in fibrous form.

Filament. A fiber of an indefinite length.

Film. A thin, flexible sheet of plastic; a thin coating of liquid or solid.
Finishing. Property-enhancing processes carried out after web is formed and bonded. Includes embossing, printing, creping, coating, etc.

Flocking. The process by which short fibers (0.1 mm) are applied to adhesive-coated nonwovens fabric to enhance the surface.

Foam bonding. The process of applying latex binder to a web which has been inflated with air; provides a means to use a binder at low water and high binder-solids concentration levels in a stabilized foam.

Froath bonding. Use of an unstable foam for bonding a fibrous web.

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G g

Garnett. A type of card machine that is designed especially to disentangle reclaimed textile fibers.

Geotextile. Fabric used in civil engineering applications to separate, reinforce soils for roads, dams, airfields, roofs; used in construction of water and waste disposal basins.

Greige. Unfinished fabric; also grey or gray fabric.

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H h

Hand. Tactile properties of a fabric related to softness, elasticity, and drapability.

Heat setting. The process of stabilizing the structure and shape of fibers or fabrics by applying heat.

Highloft. Describes low-density, bulky fabrics; (noun) a fabric with low-density and bulkiness.

Hydroentangling. The web bonding process using high-velocity water jets to wrap or knot individual fibers; also referred to as jet lacing, spunlacing.

Hydrophilic. Showing affinity for water-fabrics having this property will absorb water or wet easily.

Hydrophobic. Lacking affinity for water-fabrics having this property will not absorb water or wet easily.

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I i

Industrial fabrics. Fabrics used in applications other than hygiene, apparel, medical, and home furnishings.

Interlining. Fabric used between inner and outer layers of apparel to impart weight or stiffness, shape retention, warmth, and bulk to the garment.

Isotropic. Physical properties are the same in every direction in a material's plane; usually achieved through random-laid fibers.

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J j

Jet lacing. See Hydroentangling.

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L l

Laminate. A combined material made up of two or more layers bonded together with essentially no intermingling at the interface.

Laminating. The process of making a layered material without intermingling at the interface.

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M m

Machine-direction. The direction in which a fabric moves through a machine.

Mechanical finishing. Using a mechanical process to alter aesthetic or functional properties of a web.

Meltblowing. A method of forming fabric from thermoplastic resins; the resin is melted, extruded, and blown with fast-moving air that stretches or attenuates the fibers, which are then condensed and collected.

Meltspinning. A method of passing melted, liquid polymer through spinnerets and coagulating the material in a cold air stream.

Micron. A unit of measure equal to one millionth of a meter.

Mil. A unit of measure equal to one thousandth of an inch.

Monomer. A chemical compound that can be polymerized to form a chain of such units; see Polymer.

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N n

Napping. Mechanically raising fibers to the surface of lubricated fabric by

withdrawing fibers from the interior.

Needlepunching, needling. A physical method of mechanically interlocking fiber webs by using barbed needles to reposition some of the fibers from a horizontal to a vertical orientation.

Nonwoven. A fabric consisting of an assembly of textile fibers (oriented in one direction or in a random manner) held together (1) by mechanical interlocking; (2) by fusing of thermoplastic fibers, or (3) by bonding with a rubber, starch, glue, casein, latex, or a cellulose derivative or synthetic resin.

Nylon fiber. A manmade fiber in which the fiber-forming substance is any family of long-chain molecules that contains the recurring amide group (-NH-CO-). The two principle nylons are nylon 6 (polycaprolactam) and nylon 6,6 (polyhexamethylenediamine adipamide). Due to nylon fiber's strength and flexibility, it is used for industrial and high-performance nonwoven specialty fabrics.

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O o

Opening. Preliminary operation in the processing of staple fiber.

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P p

Permeation. The absorption and diffusion of gases or liquids through materials.

Plastic. Any of the various materials that may be fabricated into shape or form by the application of heat and pressure; can be natural or synthetic.

Plasticizer. A chemical which gives flexibility, workability, or stretchability to polymers and resins.

Ply. A layer of a fabric, web, or sheet.

Point bonding. The process of binding thermoplastic fibers in a nonwoven web by applying heat and pressure in a discrete pattern.

Polymer. A high molecular weight, chemical chain formed by linking together molecular units called monomers; the structural material of many types of fibers; can be natural or synthetic.

Polyester fiber. A manmade fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of dihydric alcohol and terephthalic acid [$C_6H_4(COOH)_2$]. The most common polyester (PET) polymer is made by reacting ethylene glycol and terephthalic acid (or its derivatives). PET fibers show high strength and are shrink- and stretch-resistant. Suitable nonwovens applications include floor coverings, fiberfill, automotive, and industrial products.

Polyethylene (PE) fiber. A manmade fiber made of ethylene (a petroleum derivative; C_2H_4) which is polymerized and then meltspun. Due to its low moisture regain, mildew- and insect-resistance, PE is used for geotextiles, outdoor furniture, packaging, and industrial applications.

Polypropylene (PP) fiber. A manmade olefin fiber made from polymers or copolymers of propylene (a petroleum derivative; C_3H_6) and is produced via meltspinning. Due to its high resistance to mechanical abuse and chemical attack, PP fibers often are used in geotextiles, carpet, automotive, upholstery, filtration, protective clothing, and industrial applications.

Print bonding. Process of applying adhesive binding only to predetermined areas of a nonwoven web in a pattern.

Pulp. A soft, moist, slightly cohering mass; usually refers to liquid slurry of woodpulp fiber and water.

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Q q

Quenching. After extrusion, the cooling of filaments using highly controlled air flow with regulated temperature to solidify filament.

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R r

Rayon fiber. A manmade fiber that is composed of cellulose derived from wood pulp, cotton linters, or other plant matter; produced by converting cellulose into unstable chemical derivative (xanthate) dissolving in caustic

solution to form viscose spinning solution, extruding into an acid solution bath to regenerate cellulose in desired form.

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S s

Saturation bonding. The bonding process that involves immersing web in a binder bath or flooding the web with binder as it enters pressure rolls.

Scouring. Operation to clean a fiber prior to processing.

Scrim. A porous web that frequently is used to reinforce web or sheet structures.

Shearing. Mechanical finishing process that cuts raised fibers to uniform heights.

Spinnerette. Perforated plate through which polymer or solution is extruded to make fiber.

Spray bonding. The process of applying atomized binder to a nonwoven web; followed by drying.

Spunbonding. The process of forming fabric by layering continuous filaments on a forming screen and bonding.

Spunlacing. See Hydroentangling.

Staple fibers. Fibers cut to specific lengths; also refers to natural fibers produced with relatively short length.

Stitchbonding. The mechanical method of combining fiber webs by using a knitting stitch and a yarn or yarn-like fiber tuft.

Strikethrough. The process by which a resin permeates through the back of an interlining during the fusing step.

Substrate. Material to which fabrics, coatings, or other materials are applied.

Sueding. Mechanical finishing process in which fibers on the surface of a fabric are cut by the abrasive action of a sanding roll operating at high speed.

Superabsorbent. A material (powder, polymer, fiber) that is capable of

absorbing substantial amounts of liquid.

Surfactant. An additive that alters the surface tension of a liquid, thus changing the surface attraction between a liquid and a solid or between two liquids.

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T t

Tear strength. Force required to cause a tear in a fabric under specific conditions.

Tensile strength. The greatest stress or load a material can bear without breaking.

Tex. The weight in grams of 1,000 meters of fiber material; system uses multiples and sub-multiples, such as kilotex (ktex) and decitex (dtex); see Denier.

Thermal bonding, Thermobonding. The process of binding by applying heat to a web of thermoplastic fibers or a web impregnated with meltable powders or thermoplastic fibers.

Thermoplastic. A plastic that melts upon heating.

Throughput. Amount of output or production per unit time.

Ticking. Strong fabric used as a covering for mattresses, pillows, and upholstery.

Tow. A twist-free bundle of continuous filaments.

Training pants. A larger diaper product, aimed at toddlers, which is pulled up over the child's hips rather than fastened at the sides.

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U u

Ultrasonic bonding. Bonding thermoplastic fibers via a high frequency mechanical movement which generates localized heat through the

vibration; also referred to as sonic bonding.

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W w

Web. Preferentially arranged assembly or sheet of fibers; see Batt.

Wetforming, wetlaying. Process of forming a web by dispersing fibers in a aqueous medium and collecting them on a screen or perforated drum.

Wet strength. Resistance of material to rupture when wet.

Wetting agent. Agent which enhances the wettability of a material or surface, and helps to spread liquid on the surface.

Wicking. Transport of liquid by capillary action within a fibrous material.

Woodpulp. Short, cellulosic fibers derived from wood; a raw material for rayon fiber; used to form paper.

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